1860MNRAS..20..293M

1860, April 15·385,	Satellite east of Saturn's centre	166″·9
	and north of axis of ring	43·5
16·417,	Satellite east of Saturn's centre	84·9
	and north of axis of ring	50·1
20·458,	Satellite west of Saturn's centre	151·6
	and north of axis of ring	39·1
21·417,	Satellite west of Saturn's centre	192·2
	and north of axis of ring	33·5
23·396,	Satellite west of Saturn's centre	213·5
	and south of axis of ring	3·7
24·437,	Satellite west of Saturn's centre	198·5
	and south of axis of ring	16·0
25·427,	Satellite west of Saturn's centre	143·9
	and south of axis of ring	32·0

Bradstones, Sandfield Park, near Liverpool,
May 10, 1860.

On the Value of the Constant of Aberration as determined by Eight Years' Observations of γ Draconis, made with the Reflex Zenith Tube at the Royal Observatory, Greenwich.

By the Rev. Robert Main, M.A., President.

This paper, the author remarks, must be taken in connexion with a paper by him printed in the twenty-fourth volume of the *Memoirs* of the Society, which gave the discussion of the observations from 1837 to 1848, made with the 25-foot zenith tube of the Royal Observatory, for the determination of the constants of aberration and nutation. The results then found were unsatisfactory, the value of the constant of aberration being considerably smaller than the received value, and the value of the annual parallax being a negative quantity amounting to nearly four-tenths of a second of space. It became, therefore, a matter of interest to determine what result for the aberration would be given by the eight years' observations which have been since that time made with the reflex zenith tube, since from the simplicity of construction of the instrument no errors are to be dreaded arising from mechanical or instrumental causes.

For the tables on which the computations are based reference is made to the preceding paper, as well as for a general explanation of the methods used in forming and solving the equations of condition. These are 106 in number, arising from groups formed from 486 observations, and contain three unknown quantities, namely, the correction to the assumed mean

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north zenith distance for the epoch chosen; the correction to the assumed value of the constant of aberration; and the constant of annual parallax. The equations are solved by the method of least squares, and the result for the constant of aberration is tolerably satisfactory, the resulting value being $20''\cdot34$. There results, however, a negative parallax amounting to $0''\cdot24$, which is larger than might have been expected, and would seem to denote some injurious effect, from atmospheric or other circumstances, on the observations.

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*Tables of the Developments of Functions in the Theory of Elliptic Motion.** By A. Cayley, Esq.

The notation made use of is as follows; viz., r, f, a, e, g denote

r, the radius vector,
f, the true anomaly,
a, the mean distance,
e, the excentricity,
g, the mean anomaly,

so that

$$\frac{r}{a}, \; = \text{elqr}\,(e, g), \text{ and}$$

$$f, \; = \text{elta}\,(e, g),$$

are known functions of e, g. Moreover, x denotes the periodic part of the quotient radius $\frac{r}{a}$, and y the equation of the centre, or periodic part of the true anomaly f; so that

$$\frac{r}{a} = 1 + x,$$

$$f = g + y,$$

and (x, y) are therefore also known functions of e, g.

Formulæ for the development in multiple cosines or sines, up to the terms in e^7, of the functions

$$(x^0, x^1, \ldots x^7) \begin{matrix}\cos\\ \sin\end{matrix}\, j\, y,$$

where j is an indeterminate symbol, are given by Leverrier in the *Annales de l'Observatoire de Paris*, tom. i. (1855), pp. 346–348. It occurred to me that it would be desirable

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* The Tables will be printed *in extenso* in the *Memoirs* of the Society. Ed.

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